



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/543,080	07/21/2005	Marco Pontanari	60130-2399; 02MRA0191	2571
26096	7590	02/21/2007		EXAMINER
CARLSON, GASKEY & OLDS, P.C. 400 WEST MAPLE ROAD SUITE 350 BIRMINGHAM, MI 48009				KNIGHT, DEREK DOUGLAS
			ART UNIT	PAPER NUMBER
			3681	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/21/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/543,080	PONTANARI ET AL.	
	Examiner	Art Unit	
	Derek D. Knight	3681	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 21 July 2005.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-12 and 14-20 is/are rejected.
- 7) Claim(s) 1,9 and 13 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 21 July 2005 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 7/21/2005.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 112. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d).

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 111. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. **Claims 1 and 9** objected to because of the following informalities: These claims state "an electronic actuator for generating an electronic signal" and "an electronic signal generated by said electronic actuator"; the examiner believes the actuator functions in response to receiving an electronic signal, as stated in claim 12.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 - 4, 6 - 12, and 14 - 19 are rejected under 35 U.S.C. 102(b) as being anticipated by **KELLER (US 5,030,181)**.

Please note that Figure 1 below has added reference letters to help identify features shown in **KELLER (US 5,030,181)**.

Regarding claims 1 and 9: KELLER discloses a drive axle assembly with a locking differential comprising a driving input (A), a carrier (C) including a pinion gear (B) driven by the driving input and a ring gear (24) in meshing engagement with said pinion gear a differential including a differential gear assembly supported within a differential case (24 and C); a pair of axle shafts (1) driven by the differential gear assembly for rotation about an axis; a locking mechanism including a shift collar (18) movable between an unlocked position where speed differentiation between said pair of

Art Unit: 3681

axle shafts is permitted and a locked position wherein said shift collar (18) directly engages the differential case (24) such that said differential case, said shift collar, and said pair of axle shafts are fixed for rotation together; and an electronic actuator (16) for generating an electronic signal to move the shift collar from said unlocked position to said locked position.

Regarding claims 2 and 10: KELLER shows the electronic actuator (16) including a coil (not numbered) mounted to an axle component (2) and surrounding the shift collar (18) wherein an electronic signal powers the coil to move the shift collar.

Regarding claim 3 and 14: KELLER shows the differential case (24 and C) includes a first case half (24) and a second case half (C) and the electronic actuator (16) selectively moves the shift collar to engage one of the case halves.

Regarding claim 4: KELLER shows a resilient member (26) for automatically returning said shift collar to the unlocked position when the coil is not powered.

Regarding claim 6: KELLER shows a washer (19) fixed to the outboard end of the shift collar. Although Keller does not show it, the washer is capable of reacting with a resilient member. Using the washer to react with a resilient member is simply intended use.

Regarding claim 7,8, and 12: KELLER shows the shift collar including an inboard end having a splined surface (21) and an out board end capable of supporting a resilient return member, the inboard end having a greater diameter than the outboard end. The coil defines a central bore surrounding the shift collar at the outboard end, said shift collar moving in an inboard direction in response to said coil being powered

Art Unit: 3681

via an electronic signal such that the splined surface (21) of the inboard end engages a mating splined surface (22) formed on said differential case (24) such that the differential case is locked to the pair of axle shafts.

Regarding claim 11: KELLER shows an axle housing (2) for substantially enclosing said carrier (C) and said pair of axle shafts (1) wherein said coil is supported by the axle housing.

Regarding claim 15: KELLER shows a pair of side gears (D and E) with one side being fixed to each of said pair of axle shafts and wherein said differential gear assembly includes a differential spider (F) having four support shafts oriented in an overall shape of a cross and four pinion gears (G), only 2 are shown in Figure 1 below, in meshing engagement with said side pair of gears with one of said four differential pinion gears being supported on each of said four support shafts and wherein said ring gear (24) is fixed to one of said first and second case halves such that said ring gear, said differential case, said differential spider, and said four differential pinion gears all rotate as one unit to transfer power to said pair of axle shafts via said pair of side gears when no speed differentiation is required and when speed differentiation is required said four differential pinion gears rotate on respective support shafts to speed up rotation of one of the pair of axle shafts via a respective one of said pair of side gears while slowing rotation of the other of said pair of axle shafts via a respective other said pair of side gears.

Regarding claim 16: KELLER shows one of said pair of axle shafts including a set of inboard splines (H) and a set of outboard splines (I), said set of inboard splines

cooperating with said respective one of said pair of side gears to fix said one of said pair of side gears for rotation with said one of said pair of axle shafts and said set of outboard splines cooperating with a splined bore formed inside said inboard of said shift collar.

Regarding claims 17-19: KELLER discloses a method for controlling a differential lock assembly for a drive axle comprising the steps of:

- a) providing a differential for driving a pair of axle shafts (1), the differential including a differential gear assembly supported within a differential case and a shift collar (18) for selective engagement with the differential case (24);
- b) energizing a coil (16) surrounding the shift collar;
- c) In response to step b) moving the shift collar from an unlocked position where speed differentiation between the pair axle shafts is permitted under predetermined conditions to a locked position where both of the pair of axle shafts rotate at a common speed by fixing the shift collar to the differential case.
- d) automatically returning the shift collar to the unlocked position when the coil is not energized
- e) providing driving input to the differential by providing a pinion gear (B) for driving a ring gear (24) attached to the differential case which comprises a first case half (24) and a second case half (C); and wherein step c) further includes moving the shift collar into direct engagement with one of the first and second case halves to fix the shift collar for rotation with the first and second case halves.

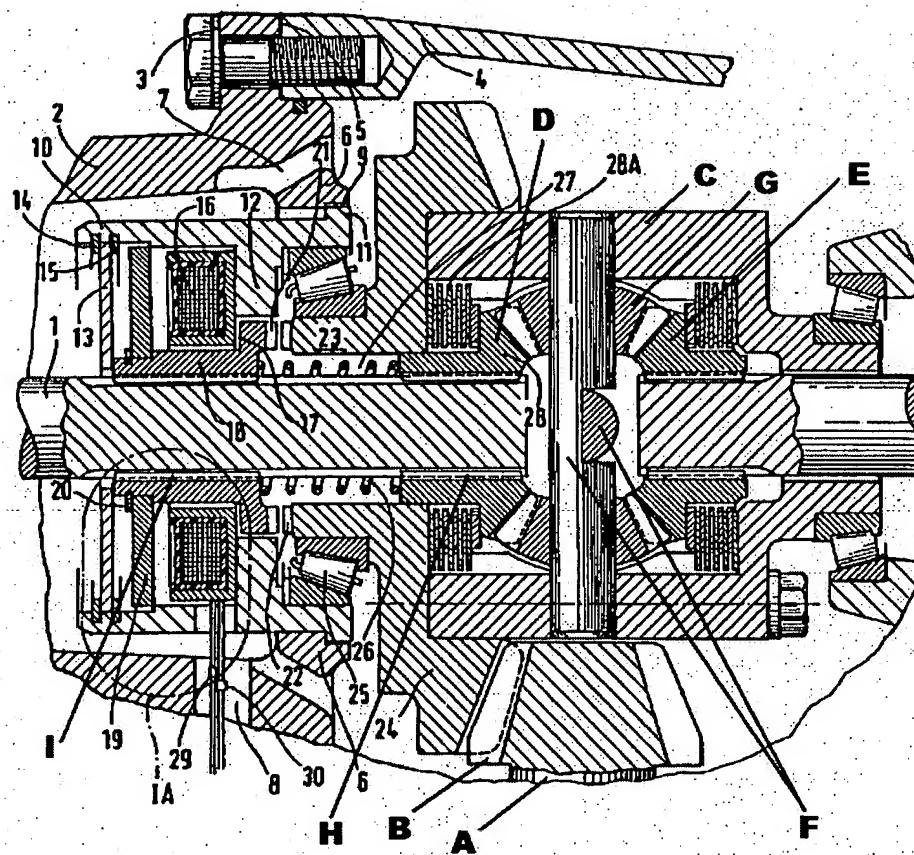


Figure 1: Taken from Figure 1 of KELLER (US 5,030,181)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over KELLER (US 5,030,181) in view of JORDAN (US 4,662,499).

KELLER, as discussed in the rejection above discloses a differential locking mechanism having a resilient member for returning a shift collar to an unlocked position when the coil is not powered, but fails to teach the resilient member reacting between the coil and an outboard end of the shift collar.

JORDAN shows in Figure 4 a differential with a shift collar (128) and a coil (130) for moving the shift collar. Jordan also shows a resilient member (129) reacting between the coil and an outboard end of the shift collar.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify **KELLER** to have a resilient member react between the coil and an outboard end of the shift collar in view of **JORDAN** to reduce the axial load put on the side gears.

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over **KELLER (US 5,030,181)** in view of **SUGIMOTO (us 6,063,000)**.

KELLER as discussed in the rejection above discloses a drive axle assembly including a pair of side gears and a differential spider having four support shafts and four pinion gears, but the spider and four pinion gears are not clearly shown in the figures.

SUGIMOTO does show, in Figure 7, a differential with a pair of side gears (10a/b) and a differential spider (not numbered) having four support shafts (16) orientated in an overall shape of a cross and four pinion gears (12) in meshing engagement with the side gears.

Art Unit: 3681

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify **KELLER** such that the differential spider was shaped like that shown in **SUGIMOTO** to reduce the number of parts, thus simplifying assembly.

Allowable Subject Matter

6. **Claim 13** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Facsimile Transmission

Submission of your response by facsimile transmission is encouraged. Group 3600's facsimile number is (571) 273-8300. Recognizing the fact that reducing cycle time in the processing and examination of patent applications will effectively increase a patent's term, it is to your benefit to submit responses by facsimile transmission whenever permissible. Such submission will place the response directly in our examining group's hands and will eliminate Post Office processing and delivery time as well as the PTO's mail room processing and delivery time. For a complete list of correspondence not permitted by facsimile transmission, see MPEP 502.01. In general, most responses and/or amendments not requiring a fee, as well as those requiring a fee but charging such fee to a deposit account, can be submitted by facsimile transmission. Responses requiring a fee which applicant is paying by check should not be submitting by facsimile transmission separately from the check.

Responses submitted by facsimile transmission should include a Certificate of Transmission (MPEP 512). The following is an example of the format the certification might take:

I hereby certify that this correspondence is being facsimile transmitted to the Patent and Trademark Office (Fax No. (571) 273-8300) on _____ (Date)

Typed or printed name of person signing this certificate:

(Signature)

If your response is submitted by facsimile transmission, you are hereby reminded that the original should be retained as evidence of authenticity (37 CFR 1.4 and MPEP 502.02). Please do not separately mail the original or another copy unless required by the Patent and Trademark Office. Submission of the original response or a follow-up copy of the response after your response has been transmitted by facsimile will only cause further unnecessary delays in the processing of your application; duplicate responses where fees are charged to a deposit account may result in those fees being charged twice.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek D. Knight whose telephone number is (571) 272-

Art Unit: 3681

7951. The examiner can normally be reached on Mon - Thurs & every other Friday,
8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles A. Marmor can be reached on (571) 272-7095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DDK

Charles A. Marmor 2/20/07

CHARLES A. MARMOR

"**EXAMINER**"

3681